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-RESEARCH ARTICLE-

THE ROLE OF DIGITAL TRANSFORMATION MECHANISMS IN PROMOTING THREE-DIMENSIONAL STRATEGIES OF SUSTAINABLE DEVELOPMENT: EVIDENCE FROM IRAQ

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─Abstract─

The limited availability of resources in the contemporary era presents a considerable challenge to the adoption of sustainable development (SD) strategies. In a time defined

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by digitalisation and globalisation, numerous researchers have highlighted the urgent necessity of digital transformation (DT) as a pathway to achieving sustainability goals. However, a discernible gap remains in the academic discourse regarding the specific contribution of DT to promoting sustainability. This study aims to explore the pivotal role of DT in advancing the three pillars of SD—economic, social, and environmental—within the commercial banking sector. Furthermore, the research emphasises the importance of information systems and communication technology in the context of Iraqi commercial banks. It seeks to examine the concept and significance of DT in this sector while delineating the various dimensions of SD strategies. The study identified the five banks most effective in implementing DT mechanisms, distributing 200 questionnaires to collect data. The analysis revealed a significant and positive correlation between DT and the dimensions of SD in the Iraqi commercial banking sector.

Keywords: Digital Transformation, Sustainable Development Strategy, Economic, Social, Environmental.

INTRODUCTION

Digital transformation, as defined in contemporary discourse, refers to the changes organisations undergo by leveraging emerging technologies to alter existing business models or create entirely new ones (Plekhanov et al., 2023). The contemporary commercial environment is transforming profoundly, with numerous such transformations being spurred on by the accelerated pace of digitalisation. Advance in digital technology has reorganized the corporate environment, and companies, regardless of size, have been compelled to make considerable operational transformations. The term 'digital institutional transformation' has been introduced to describe these changes, which go beyond the adoption of new technologies to encompass fundamentally novel approaches to conducting business and engaging with customers (Omol, 2024). In recent years, organisations have increasingly been forced to adapt to digital transformations at an unprecedented level. That in its turn underlines companies' need to apply digital processes to become competitive in an economy with high competition and lack of availability of resources. While achieving such integration may appear feasible, its success hinges on the effective implementation of digital strategies. Consequently, it is anticipated that the significance of digital transformation will continue to grow in the years ahead (Kraus et al., 2021).

DT has emerged as a critical priority for numerous organisations, evolving from being merely technology-oriented to becoming an integral component of institutional core strategies (George & Baskar, 2024; Gupta et al., 2024). Research indicates that more than 90% of executives in American and British corporations' express confidence in DT's role as a fundamental driver of business growth. Over time, the concept of DT has

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gained traction as a key mechanism for achieving competitive advantage and ensuring organisational survival in the globalised economy (Wang et al., 2020). As observed by Feng et al. (2025), SD represents one of humanity's most significant social challenges, and one shared with countries all over the planet. As a result of its publication in 1987, the Brundtland Report, SD became a focal point in discussion about the nexus between environment and economy concerns. Following its launch in Rio de Janeiro, Brazil, at the Earth Summit, it gained prominence globally and has then become included in numerous international agreements and national legislation. The relevance of SD extends beyond environmental concerns and has been incorporated into business strategies (Ruggerio, 2021). In the search for a future that is ever more environmentally friendly, SD stands at the heart of worldwide policy. There is an entire series of objectives designed to face such a challenge, with a fitting demonstration in 17 Sustainable Development Goals (SDGs) adopted in 2015 by the United Nations. These aims strive to address important economic, social, and environmental issues at a global level (Halkos & Gkampoura, 2021). Amid escalating concerns over climate change and the strain on natural resources, SD has assumed central importance for governments and international bodies. The SDGs encourage nations to limit resource depletion, improve energy efficiency, and enhance economic productivity (Tang et al., 2025).

DT has emerged as a prominent trend alongside an increasing emphasis on sustainability (Andersson & Mattsson, 2018). The convergence of technology and finance has touched numerous sectors in the economy and encouraged institution innovation. Information technology is regarded to drive long-term development, and in a realization of this, China started an experimental policy in 2011 in an attempt to promote technology and financial integration with an objective of enhancing productivity in high-tech structures This initiative has led to notable advancements in the high-technology sector (Yang et al., 2025). Sustainable business practices are increasingly supported through digitalisation, particularly by addressing components of the circular economy and SD. The social dimension of digital enterprises is also closely associated with sustainability initiatives. Furthermore, the marketplace faces pressing environmental challenges, compelling companies to incorporate environmental sustainability into their digital innovation strategies (Philbin et al., 2022). As sustainable performance increasingly becomes a necessity, with a lack of resources, adopting SD strategies is becoming a necessity. Nayal et al. (2022) numerous studies have acknowledged that a critical role in enhancing improvements in sustainability performance is played by digital technology.

DT has garnered significant attention in academic discourse, leading to its classification into distinct developmental stages. The global community is experiencing a remarkable shift towards a digital society characterised by enhanced data security and improved communication capabilities (Cichosz et al., 2020; Garzoni et al., 2020; Hussein et al., 2024; Liu et al., 2011; Zhu & Jin, 2023). These attributes are often associated with the

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Fourth Industrial Revolution, as the evolution of concepts and technologies continues to redefine traditional paradigms. The Iraqi government has set ambitious goals to embrace the Fourth Industrial Revolution by the 2030s, focusing on all sectors of the economy and transitioning from manual systems to digital frameworks (Steiber et al., 2021). As part of its strategic initiatives to enhance financial inclusion, Iraq is proactively working towards establishing a cashless society by promoting the adoption of electronic payment systems. These efforts form a cornerstone of the government's vision to achieve comprehensive and sustainable economic and social development. Within Iraq's economic context, the commercial banking sector holds a pivotal role in realising these objectives. Given the dynamic changes in the external environment and challenges such as intense competition, evolving customer expectations, and the integration of advanced technologies, banking professionals are compelled to enhance the quality of services provided. Consequently, the commercial banking industry is expected to play a crucial role in addressing these demands and supporting national development plans.

This involves utilising effective and appropriate methods to capture and sustain market share while simultaneously advancing SD objectives amidst the global transition towards employing information and communication technologies to manage and restructure financial transactions and services digitally (Flayyih et al., 2024). The present study aims to highlight the role and importance of DT as a strategy utilised by Iraqi commercial banks to achieve SD, thereby revitalising and strengthening the sector. Hanying (2019) notes that traditional banks can leverage digitalisation and increased technological investments to address shortcomings in financial innovation, enabling them to compete with both established financial institutions and emerging FinTech firms. Analysis of DT's impact on Iraq's banking sector reveals limited progress in digitising routine banking operations. Moreover, in light of the challenges posed by FinTech developments, declining growth and profitability following the 2008 global financial crisis, and disruptions caused by the ISIS conflict and the COVID-19 pandemic, commercial banks are increasingly encouraged to adopt FinTech solutions to transform their service offerings.

DT serves as a foundational step toward achieving and enhancing SD. This underscores the critical role of DT as both a strategy and an enabler for SD initiatives within the Iraqi banking industry, particularly among commercial banks. The current research seeks to explore the concept of DT and its significance in Iraq's commercial banking sector, alongside the multifaceted dimensions of SD strategies. Furthermore, it examines how DT contributes to achieving SD, with a particular focus on fostering digital leadership and advancing SD in Iraq. The study also investigates new aspects arising from the evolving digital landscape and the existing dynamics of the banking sector, aiming to evaluate the level of attention various management tiers devote to different SD dimensions.

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LITERATURE REVIEW

The relationship between DT and SD represents a critical area of scholarly inquiry (Alojail & Khan, 2023; Andersson & Mattsson, 2018; Nayal et al., 2022; Su & Wu, 2024). ElMassah and Mohieldin (2020) examined DT's impact on strategies to achieve SD, conducting a study across seven nations—Cambodia, Colombia, Egypt, Ghana, Kenya, the Philippines, and Tunisia. Their findings highlighted the need for policymakers in developing nations to prioritise investments in infrastructure, focusing on e-government and big data to advance SD objectives. Kunkel and Matthess (2020) investigated the rising utilisation of information and communication technology (ICT) across industries and its effects on environmental SD. Analysing four African countries (South Africa, Rwanda, Kenya, and Nigeria) and three from East Asia and the Pacific (China, Thailand, and the Philippines), they proposed a framework distinguishing between ICT's direct and indirect impacts throughout its lifecycle and economic activities.

Similarly, Castro et al. (2021) sought to identify gaps in SD goals and explored the potential role of big data and artificial intelligence (AI) in bridging these gaps by 2030. Through a systematic review of 555 studies, coupled with a qualitative analysis, they uncovered key insights into the intersection of digitalisation and SD. Bai et al. (2021) reviewed post-COVID-19 literature to propose a framework for utilising DT in advancing SD among small enterprises. They emphasised the integration of digitisation within supply chains and the importance of sustainable production practices as central to DT initiatives. In a related context, Ufua et al. (2021) explored DT strategies aimed at achieving the United Nations' SD goals, particularly goals 4 and 9, in Nigeria. Their conceptual study underscored the value of a multidisciplinary approach involving stakeholder engagement and institutional collaboration. Lastly, Ziadlou (2021) examined human factors driving DT to support SD, conducting qualitative research with ten healthcare leaders in the United States. The study identified six core themes—knowledge development, innovation, motivation, global strategy, leadership, and cooperation—along with two secondary themes: mindset change and vision creation. These findings underscore the complexity and multidimensional nature of DT in achieving sustainable outcomes.

Nayal et al. (2022) investigated the influence of collaboration and coordination on supply chains, SD strategies, DT, and the associated collaborative benefits on company performance within the context of sustainable supply chains. The study utilised a sample of 361 respondents from India's automotive sector. The results indicated that supply chains positively influence both SD and DT strategies, which subsequently lead to collaborative advantages. It was further found that DT and supply chains fully mediate these collaborative benefits. Guan et al. (2023) focused on the interplay between environmental strategies and SD within China's rare earth metals sector, emphasising

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the interaction between DT and environmental approaches. The findings demonstrated that DT and environmental strategies are mutually reinforcing, collectively supporting the SD of the rare earth metal industry. Experimental data highlighted the pivotal role of environmental strategies in linking DT with SD outcomes.

Alojail and Khan (2023) conducted a survey involving 760 stakeholders, using a questionnaire-based approach. The study revealed that institutions must strike a balance between transformation efficiency and the long-term impacts of SD. The integration of sustainability principles with SD was found to enhance transformation effectiveness while improving social, economic, and environmental performance. Zhanbayev et al. (2023) explored the demo-ethical model of sociocultural dynamics in contemporary society, particularly as manifested in the digital realm. Through a review of literature, analysis of existing debates, and case studies, the researchers identified key elements of ethical modelling and provided actionable recommendations. The study concluded that the democratic foundation of sustainability is rooted in a new spirituality aimed at advancing societal development. This interconnected model highlighted the relationship between society and nature while integrating demographic, social, economic, and environmental dimensions in both spatial and temporal contexts. Based on previous literature, here are the study hypotheses:

H1: *There is a statistically significant relationship between DT and SD.*
H2: *There is a statistically significant relationship between DT and economic dimension of SD.*
H3: *There is a statistically significant relationship between DT and social dimension of SD.*
H4: *There is a statistically significant relationship between DT and environmental dimension of SD.*

METHODOLOGY

Study Sample

The target population for this research included individuals affiliated with commercial banks listed on the Iraq Stock Exchange. This group included employees, branch managers, accountants, auditors, and consultants, who played a pivotal role in initiating and implementing DT strategies and mechanisms. These mechanisms, encompassing various dimensions, formed the basis for achieving the strategic objectives of SD. Out of the 22 Iraqi banks, five were identified as having the most extensive application of DT mechanisms. A total of 200 questionnaires were returned, representing a response rate of 86.95%, which is considered highly satisfactory for accurately representing the sample population and achieving the objectives of the study. Table 1 shows characteristics of the sample.

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Table 1: Characteristics of Sample.

Sample	Details	Number	Ratio
Gender	Female	58	29%
	Male	142	71%
Education Level	Bachelor's Degree	165	82.5%
	Diploma	24	12%
	Master's Degree	7	3.5%
	PhD	4	2%
Experience	Less than 5 Years	16	8%
	From 5 to 10 Years	47	23.5%
	from 11 to 15 Years 15	56	28%
	from 16 to 20 Years 20	40	20%
	From 21 to 25 Years25	19	9.5%
	From 26 Years and Over	22	11%
Domain	Accountant	59	29.5%
	Auditor	45	22.5%
	Administrative Employee	40	20%
	IT	30	15%
	Other	26	13%

Design of the Measurement Tool

The questionnaire, specifically designed for this research, comprised twenty-five questions aimed at measuring the study variables. The DT variable was assessed using ten questions, while the SD variable was evaluated through fifteen questions. These were evenly distributed across three dimensions—economic, social, and environmental—with each dimension encompassing five questions.

Hypothetical Research Model

Figure 1 illustrates the study model, which seeks to examine the contribution of DT in enhancing three-dimensional SD, focusing on the internal dimensions of economic, social, and environmental factors.

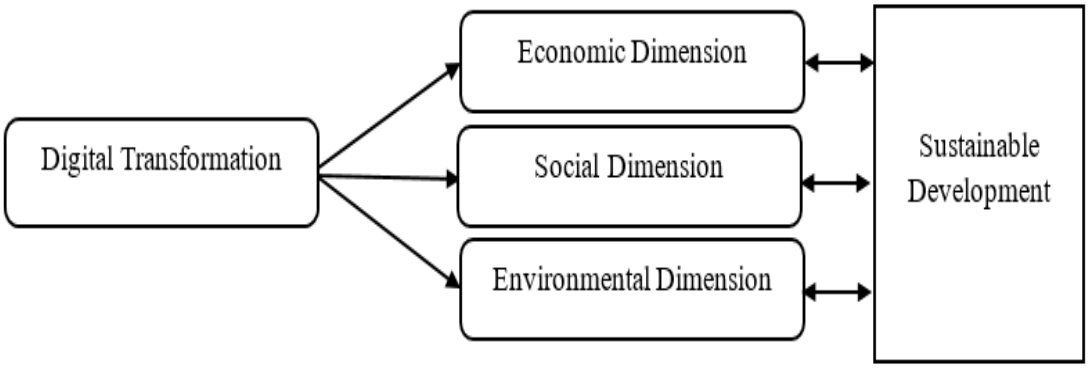

Figure 1: Study Model

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RESULTS

Descriptive Statistics

Table 2 presents the descriptive analysis of the research variables and their respective dimensions, utilising means, standard deviations, coefficients of variation, and relative importance. Mean scores for all variables were statistically significant, as demonstrated by the results presented in Table 2 ($p<0.05$). The results revealed that the social dimension exhibited a relatively higher mean score (M=3.680, SD=0.7814, R.I.=78.14%). The economic dimension followed, with a mean score of 3.587, a standard deviation of 0.6322, and a relative importance of 71.74%. In terms of the environment, the environmental dimension ranked third, with a mean score of 3.567, a standard deviation of 0.6320, and a relative importance index (RII) of 71.34%. Finally, the DT variable recorded the lowest mean score of 3.464, a standard deviation of 0.6743, and a relative importance coefficient of 69%. This suggests that while the SD variable is at a moderate level, the DT variable also exhibits moderate levels within the Iraqi banks under investigation. As indicated by these findings, it is clear that these banks need to enhance their efforts in DT processes, such as expanding online banking opportunities through mobile applications or e-wallets to improve accessibility and convenience. Furthermore, banks should provide a range of digital channels for banking services at an intermediate level to enhance customer access. Expanding banking products boosts digital performance, meeting customers' evolving needs.

Table 2: Descriptive Statistics

Variables	Mean	Standard Deviation	Coefficient of Variation	Relative Importance
DT	3.464	0.6743	0.19	69.28
SD	3.504	0.629	0.18	70.08
Economic Dimension	3.587	0.6322	0.18	71.74
Social Dimension	3.68	0.7814	0.21	73.6
Environmental Dimension	3.567	0.632	0.18	71.34

Inferential Statistics

To perform the inferential testing for the study's hypotheses, four structural models will be created, each designed to correspond to a specific hypothesis, as outlined below:

The Relationship between DT and SD

This model seeks to test the primary hypothesis, which explores the influence of DT, represented by its ten components and three dimensions (Economic, Social, and Environmental), on Iraqi commercial banks within the study population, as depicted in Figure 2.

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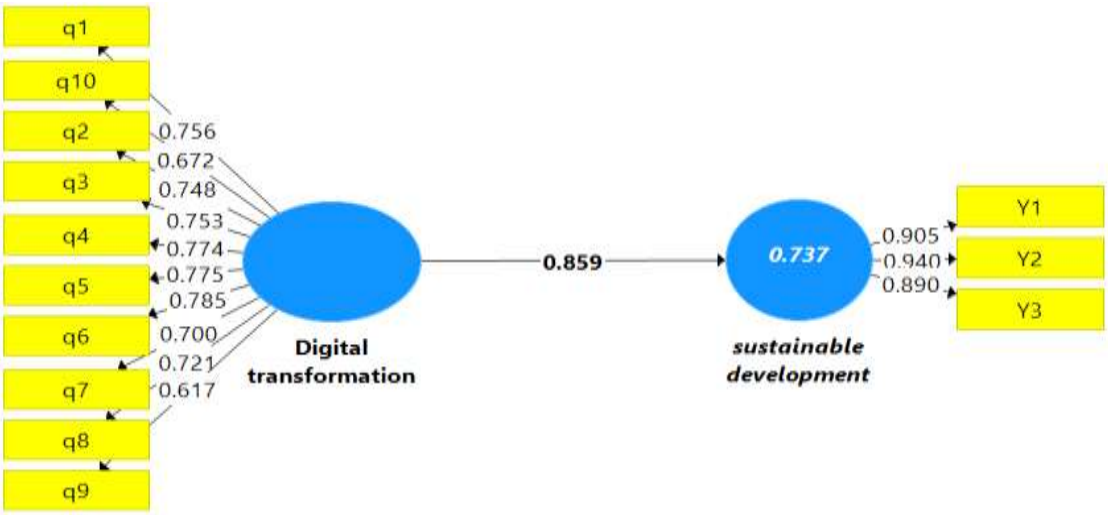

Figure 2: Examination of the Main Model Quality.

Table 3. presents the validity and reliability analysis of the fourth model. The factor loadings of the first model fall below the expected goodness of fit threshold, as detailed in Table 3. With the exception of DT items 9 and 10, all other items examined exceed the 0.70 threshold.

Table 3: Validity and Reliability of the Forth Model

Variables	Questions	Question intensity	AVE	C.R	Alpha Cronbach
DT	q1	0.756	0.536	0.92	0.903
	q2	0.748			
	q3	0.753			
	q4	0.774			
	q5	0.775			
	q6	0.785			
	q7	0.7			
	q8	0.721			
	q9	0.617			
	q10	0.672			
SD	Social Dimension	0.94	0.831	0.937	0.898
	Economic Dimension	0.905			
	Environmental Dimension	0.89			

Additionally, the loadings indicate high levels of Cronbach's Alpha, AVE, and Composite Reliability (CR) index, suggesting that the model is both valid and reliable, thus providing a robust explanation of the phenomenon under investigation. We now proceed with testing the primary hypothesis of the study using structural equation modelling (SEM), as illustrated in Figure 3.

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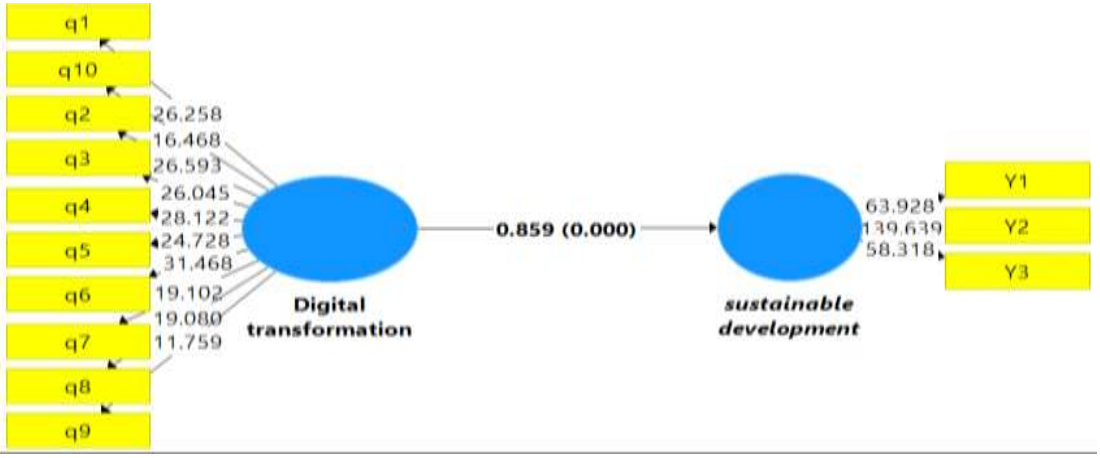

Figure 3: The Structural Model of the Main Model

The results depicted in Table 4 demonstrate a strong positive association between DT and SD across its dimensions, as evidenced by a P-value of 0.000, which is well below the 0.05 significance threshold at a 1% significance level. Additionally, the T-value of 11.893 surpasses the critical T-value of 1.69. The effect size of 0.859 indicates that a one-unit increase in DT corresponds to an 85.9% enhancement in SD practices within Iraqi commercial banks. Thus, the primary hypothesis of this study—"A statistically significant relationship exists between DT and the achievement of SD"—is validated. These results emphasize the essential role of DT implementation in banking institutions for effectively achieving SD goals. This aligns with the conclusions drawn by Castro et al. (2021), who highlighted the gaps in sustainable development goals and the potential for digital frameworks to address these deficiencies. Similarly, the current study advocates for the advancement of DT within Iraqi commercial banks to elevate their performance and strategic contributions towards SD. In parallel, Bai et al. (2021) stress the pivotal role of small and micro-enterprises in the supply chain and the imperative of digitalisation. A crucial aspect of this transformation involves promoting sustainable production and consumption practices. Establishing an inclusive platform that facilitates SME access to digital technologies while monitoring their environmental, social, and economic impacts is vital, ensuring alignment with established policies.

Table 4: The Third Model of the Study

Paths	Original Sample (O)	(STDEV)	T Statistics (|O/STDEV|)	P Values
DT -> SD	0.859	0.017	51.132	0.000

The Relationship between DT and SD

This study seeks to test the sub-hypotheses by examining how the internal dimensions of SD within Iraqi commercial banks (economic, social, and environmental) are impacted by DT, as measured by its 10 components. This is illustrated in Figure 4.

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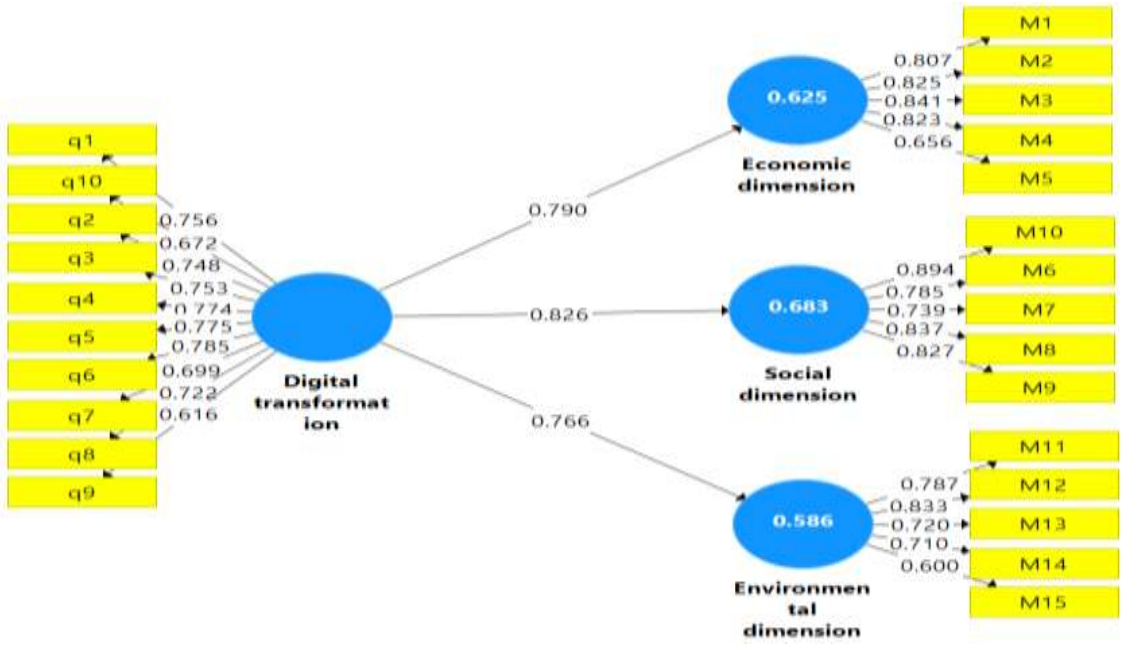

Figure 4: The Quality of the Study Structural Model for the Dimension's Relationship.

The second structural model, as presented in Table 5, meets the goodness-of-fit criteria, with all items related to the variables of interest having loadings exceeding 0.70, except for items 9 and 10 in the DT variable, as well as item M5 in the economic dimension and item M15 in the environmental dimension.

Table 5: Validity and Reliability of the Study Questionnaire

Variables	Questions	Question Intensity	AVE	C.R	Alpha Cronbach
Digital Transformation	q1	0.756	0.536	0.92	0.903
	q2	0.748			
	q3	0.753			
	q4	0.774			
	q5	0.775			
	q6	0.785			
	q7	0.7			
	q8	0.721			
	q9	0.617			
	q10	0.672			
Economic Dimension	M1	0.807	0.63	0.854	0.85
	M2	0.825			
	M3	0.841			
	M4	0.823			
	M5	0.656			
Social Dimension	M6	0.785	0.669	0.885	0.876
	M7	0.739			
	M8	0.837			
	M9	0.827			
	M10	0.894			

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Table 5: Validity and Reliability of the Study Questionnaire (Cont…)

Variables	Questions	Question Intensity	AVE	C.R	Alpha Cronbach
Environmental Dimension	M11	0.787	0.852	0.852	0.79
	M12	0.833			
	M13	0.72			
	M14	0.71			
	M15	0.6			

The model's strong validity and reliability are supported by Cronbach's alpha, AVE, and CR. Figure 5 presents the second structural model, which measures DT and the dimensions of SD.

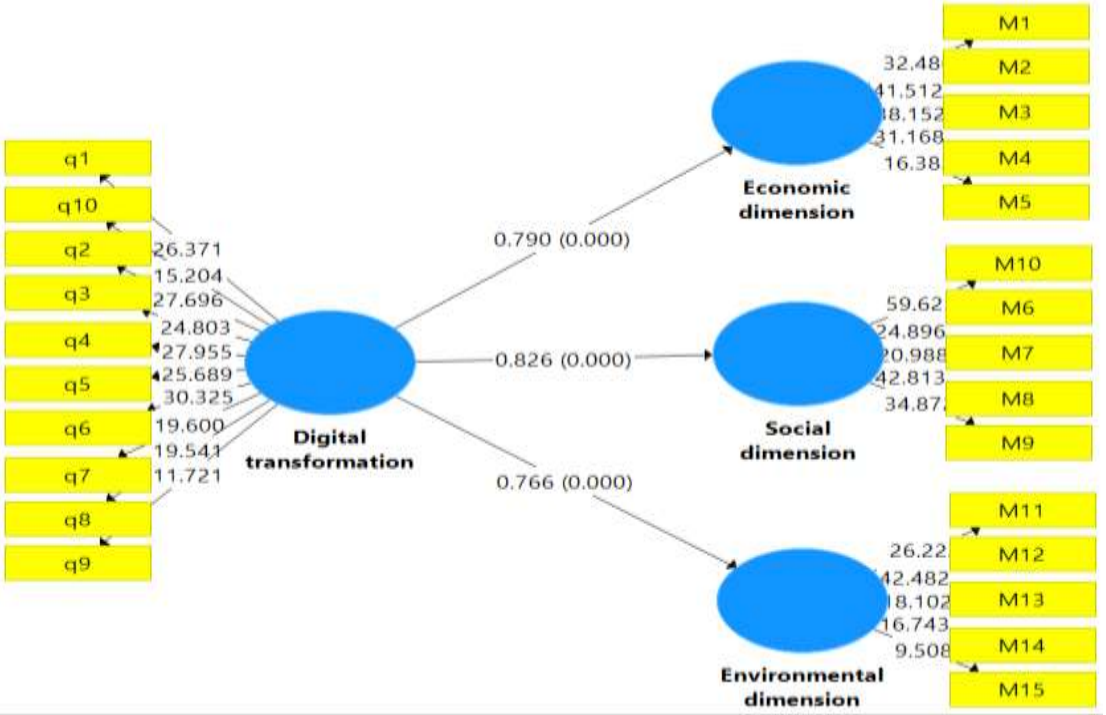

Figure 5: The Structural Model of the Study for the Dimension's Relationship.

The inferential test of the second structural model for testing the three sub-hypotheses is shown in Table 6. There is an explanation of the three pathways:

Pathway 1: The Impact of DT on Enhancing the Social Dimension:

The results presented in Table 6 indicate a clear positive impact of DT activities on the social dimension. This is supported by a p-value of 0.000 (which is less than 0.05) at the 1% significance level and a t-value of 42.923 (which exceeds the critical value of +1.69). This indicates that a one-unit rise in DT results in an estimated 82.6% enhancement in the social dimension of Iraqi commercial banks. When compared to other aspects of SD, the social dimension is ranked first, with an effect size of 0.826.

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Therefore, we accept alternative hypothesis 2, which states that "DT significantly enhances the social dimension within Iraqi commercial banks under study." This finding is crucial in emphasising the importance of DT in enhancing the social aspects of SD in Iraq's banking sector, potentially improving service quality, broadening access to financial services, elevating living standards, and fostering social justice.

Pathway 2: The Effect of DT on Improving the Economic Dimension:

The direct positive influence of DT on the economic dimension is demonstrated in Table 6, where the p-value is 0.000 (below the 0.05 threshold) at the 1% significance level, and the t-value of 24.627 exceeds the critical value of 1.69. The effect size of 0.790 indicates that a one-unit increase in DT improves the economic dimension in Iraqi commercial banks by 79%. This result ranks second in terms of impact compared to other SD dimensions, This validates the first sub-hypothesis, indicating a statistically significant correlation between DT and the improvement of the economic dimension in the Iraqi commercial banks under study. These findings suggest that DT plays a pivotal role in improving financial performance, boosting operational efficiency, and increasing competitiveness within the banking sector in Baghdad.

Pathway 3: The Implications of DT for the Environmental Dimension:

The results outlined in Table 6 reveal a statistically significant influence of DT on the environmental dimension, with a p-value of 0.000 (below the 0.05 threshold) at a 1% significance level and a t-value of 33.777, surpassing the critical value of 1.69. An effect size of 0.766 suggests that a one-unit increase in DT results in a 76.6% enhancement in the environmental practices of Iraqi commercial banks. This impact ranks third among the SD dimensions examined. Accordingly, the third sub-hypothesis, i.e., "There is a positive and significant relation between DT and improvement in the environment in Iraqi commercial banks under investigation," is validated. These findings highlight the vital role of DT in promoting environmentally sustainable banking practices, including optimising resource utilisation and reducing carbon emissions.

Table 6: Testing the Three Sub-Hypotheses

Paths	Direct effects	T	P-value	P<0.05
DT → Economic Dimension	0.826	42.923	0.000	Accepted
DT → Social Dimension	0.790	24.627	0.000	Accepted
DT → Digital Dimension	0.766	33.777	0.000	Accepted

DISCUSSION OF RESULTS

The results of this study indicate that DT has a positive relationship and plays a crucial role in enhancing SD strategies among commercial banks in Iraq. This finding is significant, as the primary hypothesis sought to evaluate whether a connection exists

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between DT and the achievement of SD, ultimately leading to the acceptance of this hypothesis. It emphasises sound DT practice in Iraqi commercial banks to respond and answer their SD objectives. As such, Iraqi commercial banks are advised to develop and expand DT programmes, not only improving their performance but positively impacting SD in harmony with their orientation and objectives. These conclusions align with Castro et al. (2021), who identified key gaps in sustainability development goal achievement and called for further exploration into the role of digitalisation in addressing these gaps. Additionally, Bai et al. (2021) highlighted the importance of digitising small and micro-enterprises across supply chains, as these entities play vital roles in most industries. A central aspect of DT involves promoting sustainable production and consumption patterns, where policymakers can establish comprehensive platforms that enable SMEs to access digital technologies while monitoring environmental, social, and economic outcomes. Furthermore, the findings of this study also confirm that DT influences the three sub-dimensions of SD—economic, social, and environmental—a view that is consistent with the work of (Yongjie, 2023).

SOCIAL IMPACTS OF THE CURRENT STUDY

The findings of this research hold significant implications for Iraq. The country's economic development is closely tied to the effective operation of its banking sector, which necessitates greater investment in the enhancement of digital and technological capabilities within the banking system. Following this, it is crucial to establish and implement modern training programmes for bank staff to ensure they are proficient in using current digital technologies. Furthermore, fostering collaboration between social development organisations and commercial banks is critical for creating digital solutions in accordance with the national SD objectives. Iraqi commercial banks should be encouraged to design and implement effective digital strategies that incorporate DT to support the country's economic development and growth.

Enhancing the electronic governance of such banks will enable them to integrate ICT in banking and contribute towards realizing economic objectives. Innovation and competitiveness in such a changing environment of digital banking must be encouraged and supported through budgetary appropriations for such programs. It is also crucial that banks establish and pursue digital projects and initiatives aimed at greening their business processes and reducing environmental degradation. Such programmes should raise awareness among employees and clients regarding the role of DT in promoting environmental sustainability. Establishing dedicated units or departments within banks to design and implement eco-friendly DTs is also necessary, as these would be perceived as innovative and forward-thinking, ultimately contributing to a more sustainable banking sector.

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CONCLUSION

This research aims to emphasise the significance of information systems and communication technology mechanisms within the context of the Iraqi commercial banking sector. Technological advancements in this sector have included the integration of DT mechanisms into the infrastructure of Iraqi commercial banks, which has become a primary objective for these institutions, reflecting the broader concept of SD. Digitalisation has fostered new patterns, giving rise to an information-based society striving to achieve comprehensive SD goals. In light of these findings, we propose several areas that warrant further exploration in relation to DT, particularly concerning IT governance, its role in enhancing sustainable competitive advantage, and e-governance and its impact on DT. The social implications of this research highlight the need for increased efforts by bank managers in Iraq to invest in digital infrastructure, thus improving technological and digital capabilities. Specifically, bank employees should be trained to effectively use modern DT tools, and collaboration with various sectors could facilitate the development of innovative products. Consequently, it is crucial that Iraqi commercial banks devise a unified strategic plan that links DT with Iraq's economic growth and development strategies. Strengthening digital governance structures within banks is also necessary to ensure the effective utilisation of these technologies and the achievement of economic objectives. Additionally, supporting ongoing research and development in cutting-edge digital banking technologies will foster innovation and enhance competitiveness, provided that sufficient budget allocations are made for these purposes. Furthermore, banks should develop digital strategies and campaigns aimed at reducing their environmental impact, raising awareness about sustainability among both employees and clients, and promoting green practices. Establishing specialised units or departments within banks to plan and implement environmentally friendly DT initiatives will also be vital in achieving these goals.

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